WATER QUALITY OF PRAIRIE COUNTY

Ground Water

A total of two ground water samples were collected from one well in Prairie County (see attached map) as part of the 2005 Yellowstone River Valley Project. The well sampled was shallow (60 feet) and was located down gradient of irrigated cropland areas (see attached map for location). No pesticides were detected in the ground water samples collected in Prairie County. Nitrate was detected in one of the ground-water samples at a concentration of 1.0 mg/L. The human health standard for nitrate in drinking water is 10 mg/L.

Public water supplies are required to periodically test their water for various constituents including pesticides and nitrate. A search of public water supplies entities in Prairie County revealed only one public water supply that may be obtaining water from shallow ground water in alluvial aquifers along the Yellowstone River. This public water supply has been tested for pesticides three times since 2000 and no pesticides have been detected. It has been tested for nitrate six times since 2000 and all six samples contained low concentrations of nitrate (0.09-0.34 mg/L). All other public water supplies in the Yellowstone River Valley of Prairie County are obtaining water from deep (>700 feet) bedrock aquifers which are generally not vulnerable to human activities at the surface and none of them have had any pesticide detections for the period from 2000 to the present.

The Montana Bureau of Mines and Geology (MBMG) conducted a study of ground-water resources in the lower Yellowstone River basin during 1995 (Smith, et al, 2000). During this study the MBMG collected numerous ground water samples in the region and tested them for nitrate. Approximately five of these samples were collected from wells obtaining water from shallow alluvial aquifers along the Yellowstone River Valley in Prairie County. Nitrate was detected in all 5 wells sampled. Concentrations ranged from 0.38 to 14.46 mg/L, with a median concentration of 2.48 mg/L. Only one of the 5 samples exceeded the drinking water standard of 10 mg/L for nitrate.

Surface Water

We were unable to locate any water quality data for the Yellowstone River in Prairie County. However, the U.S. Geological Survey (USGS) has collected samples from the Yellowstone River near Forsyth and analyzed them for pesticides and nutrients. They have also collected nutrient samples from the Powder River near Locate in Custer County. Although none of these sampling stations is in Prairie County the cumulative data may be an indicator of the water quality of the Yellowstone River coming into Prairie County.

Between 1999 and September 2004 the USGS collected 65 samples from the Yellowstone River near Forsyth and analyzed them for pesticides. The most commonly detected pesticides were atrazine, triallate, metolachlor, prometon, and cyanazine (see table below). All these pesticides, with the exception of prometon, are commonly used herbicides in corn, sugar beets, and small grain crops. Prometon, which is a nonselective herbicide used in non-agricultural settings, is more commonly used and detected in urban areas (Barbash and Resek, 1996). All of the

pesticide concentrations were low and none of the concentrations exceeded any human health standards or aquatic life standards where such standards exist. It is important to note that many of the herbicides used for noxious weed control (2,4-D, picloram, and imazapyr, to name a few) were not analyzed for during the USGS monitoring effort, so the impacts of these control measures on the Yellowstone River remain unclear.

Between 1999 and September 2004 the USGS collected 74 samples from the Yellowstone River near Forsyth and analyzed them for nitrate (see table below). Nitrate was detected in 72 of the 74 samples at concentrations ranging from 0.03 – 0.65 mg/L, with a median concentration of 0.2 mg/L (see table below). Nitrate concentrations showed a seasonal variation with higher concentrations occurring between October and March and lower concentrations occurring during the April to September time frame (Miller et al, 2004). These seasonal variations are believed to be due to a lack of algal activity which consumes nitrate during the winter as well as decreased dilution due to low stream flows during the winter.

Between 1999 and 2004 the USGS collected 69 samples from the Powder River near Locate and analyzed them for nitrate. Although this sampling site is not in Prairie County the Powder River does flow through Prairie County and dumps into the Yellowstone River in the county. Nitrate was detected in 43 of the 69 samples at concentrations ranging from 0.013 – 1.58 mg/L and a median concentration of 0.3 mg/L.

Summary of Pesticide*/Nitrate Detections in the Yellowstone River near Forsyth from 1999 through September 2004 Collected by the U.S. Geological Survey

Pesticide Compound	Number of Samples Collected	Number of Samples with Pesticide Detected	Percent of Samples with Pesticide Detected	Minimum Concentration (μg/L)	Maximum Concentration (μg/L)	Drinking Water Standard (μg/L)	Aquatic Life Standard (μg/L)
Atrazine	65	51	78.5	E 0.003	0.328	3	1.80
Benfluralin	65	1	1.5	--	E 0.003	--	--
Carbaryl	65	1	1.5	--	0.005	700	0.20
Carbofuran	65	1	1.5	--	E 0.034	40	1.80
Chlorpyrifos	65	1	1.5	--	E 0.002	20	0.041
Cyanazine	65	10	15.4	E 0.003	0.018	1	2.0
EPTC	65	7	10.8	E 0.001	0.16	--	--
Malathion	65	1	1.5	--	E 0.004	100	0.10
Metolachlor	65	29	44.6	E 0.002	0.034	100	7.80
Prometon	65	19	29.2	M	E 0.01	100	--
Propargite	65	1	1.5	--	0.41	--	--
Simazine	65	1	1.5	--	E 0.003	4	10
Tebuthiuron	65	2	3.1	M	E 0.01	500	1.60
Triallate	65	33	50.8	E 0.001	0.012	--	0.24
Trifluralin	65	1	1.5	--	E 0.002	5	0.20

Nutrient Compound	Number of Samples Collected	Number of Samples with Nitrate Detected	Percent of Samples with Nitrate Detected	Minimum Concentration (mg/L)	Maximum Concentration (mg/L)	Drinking Water Standard (mg/L)	Aquatic Life Standard (mg/L)
Nitrate + Nitrite	74	72	97.3	0.03 E	0.65	10	--

E = Estimated value M = Presence of chemical verified but not quantified
* This table only contains a summary of pesticides detected; many other pesticides were analyzed for and not detected

Barbash, J.E., and Resek, E.A., 1996, Pesticides in ground water – Distribution, Trends, and Governing Factors: Chelsea, Michigan, Ann Arbor Press, Pesticides in the Hydrologic System series, v. 2, 588 p.

Miller, K.A., Clark, M.L., and Wright, P.R., 2004, Water Quality Assessment of the Yellowstone River Basin, Montana and Wyoming – Water Quality of Fixed Sites, 1999-2001, U.S. Geological Survey Scientific Investigation Report 2004-5113.

Smith, L.N., LaFave, J.I., Patton, T.W., Rose, J.C., and McKenna, D.P., 2000, Ground-Water Resources of the Lower Yellowstone River Area: Dawson, Fallon, Prairie, Richland, and Wibaux Counties, Montana. Montana Bureau of Mines and Geology Montana Ground-Water Assessment Atlas No. 1.